

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Assignee(s):	§	
BMC Software, Inc.	§	Art Unit: 2163
	§	
Serial No.: 10/034,438	§	Examiner: Linh Black
	§	
Filed: 27 December 2001	§	Docket No.: 149-0055US
	§	
For: System and Method for Controlling	§	Customer No.: 29855
Free Space Distribution by Key		
Range within a Database		

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Commissioner for Patents
P. O. Box 1450
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REPLY BRIEF

This is a reply brief in the appeal from the rejection of claims 18-42 in the Final Office
Action dated 09 February 2006 for the above-referenced application.

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REAL PARTY IN INTEREST

The real party in interest in the above referenced patent application is BMC Software,
Inc. of Houston, Texas.

RELATED APPEALS AND INTERFERENCES

To the present knowledge of Appellant's representative, there are currently no related appeal or interference proceedings that will directly affect, or be directly affected by, or have a bearing on, the Board's decision in the present Appeal.

STATUS OF CLAIMS

In the aforementioned Final Office Action, claims 18-42 were rejected. Claims 1-17 are cancelled. Claims 18-42 are appealed.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Final Office Action mailed 09
February 2006.

SUMMARY OF CLAIMED SUBJECT MATTER

A. Concise Explanation of Independent Claim 18

Independent claim 18 is directed to a database free space management method, comprising:

(1) “identifying a first range of key values associated with a first set of rows in a database file,” which is referred to in the specification at pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); and pg. 16 (*ll.* 10-19) and in the drawings by reference to KEYRANGES, KEYRANGESSETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4.

(2) “assigning first values to each of a plurality of free space management parameters associated with the first range of key values,” which is referred to in the specification at p. 8 (*ll.* 26-31) and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES of FIG. 4 and by reference character (604) of FIG. 6.

(3) “identifying a second range of key values associated with a second set of rows in the database file,” which is referred to in the specification at pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); and pg. 16 (*ll.* 10-19) and in the drawings by reference to KEYRANGES, KEYRANGESSETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4.

(4) “assigning second values to each of a plurality of free space management parameters associated with the second range of key values,” which is referred to in the specification at p. 8 (*ll.* 26-31) and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES of FIG. 4 and by reference character (604) of FIG. 6.

(5) “managing free space associated with the first set of rows in accordance with the first values,” which is referred to in the specification at pg. 9 (*l.* 9) to pg. 10 (*l.* 14) and pg. 10 (*l.* 26) to pg. 11 (*l.* 8) and in the drawings by reference character (350) of FIG. 3b.

(6) “managing free space associated with the second set of rows in accordance with the second values,” which is referred to in the specification at pg. 9 (*l.* 9) to pg. 10 (*l.* 14) and pg. 10 (*l.* 26) to pg. 11 (*l.* 8) and in the drawings by reference character (350) of FIG. 3b.

(7) “wherein the second values differ from the first values by at least one free space management parameter value, thereby producing non-uniform distribution of free space in the database file,” which is referred to in the specification at pg. 10 (*ll.* 15-25); pg. 12 (*ll.* 6-19); and pg. 13 (*ll.* 8-9 and 26-27) and in the drawings by reference character (350) of FIG. 3b.

B. Concise Explanation of Independent Claim 28

Independent claim 28 is directed to a program storage device, readable by a programmable control device, comprising instructions stored on the program storage device. The programmable control device is caused to:

(1) “identify a first range of key values associated with a first set of rows in a database file,” which is referred to in the specification at pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); and pg. 16 (*ll.* 10-19) and in the drawings by reference to KEYRANGES, KEYRANGESSETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4.

(2) “assign first values to each of a plurality of free space management parameters associated with the first range of key values,” which is referred to in the specification at p. 8 (*ll.* 26-31) and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES of FIG. 4 and by reference character (604) of FIG. 6.

(3) “identify a second range of key values associated with a second set of rows in the database file,” which is referred to in the specification at pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); and pg. 16 (*ll.* 10-19) and in the drawings by reference to KEYRANGES, KEYRANGESSETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4.

(4) “assign second values to each of a plurality of free space management parameters associated with the second range of key values,” which is referred to in the specification at p. 8 (*ll.* 26-31) and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES of FIG. 4 and by reference character (604) of FIG. 6.

(5) “manage free space associated with the first set of rows in accordance with the first values,” which is referred to in the specification at pg. 9 (*l.* 9) to pg. 10 (*l.* 14) and pg. 10 (*l.* 26) to pg. 11 (*l.* 8) and in the drawings by reference character (350) of FIG. 3b.

(6) “manage free space associated with the second set of rows in accordance with the second values,” which is referred to in the specification at pg. 9 (*l.* 9) to pg. 10 (*l.* 14) and pg. 10 (*l.* 26) to pg. 11 (*l.* 8) and in the drawings by reference character (350) of FIG. 3b.

(7) “wherein the second values differ from the first values by at least one free space management parameter value, thereby producing non-uniform distribution of free space in the database file,” which is referred to in the specification at pg. 10 (*ll.* 15-25); pg. 12 (*ll.* 6-19); and pg. 13 (*ll.* 8-9 and 26-27) and in the drawings by reference character (350) of FIG. 3b.

C. Concise Explanation of Independent Claim 35

Independent claim 35 is directed to a database free space management method, comprising:

(1) “designating a first set of rows of a file object with a first range of key values,” which is referred to in the specification at pg. 8 (*ll.* 26-31); pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); pg. 16 (*ll.* 10-19); and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES, KEYRANGESETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4 and by reference character (604) of FIG. 6.

(2) “designating a second set of rows of the file object with a second range of key values,” which is referred to in the specification at pg. 8 (*ll.* 26-31); pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); pg. 16 (*ll.* 10-19); and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES, KEYRANGESETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4 and by reference character (604) of FIG. 6.

(3) “non-uniformly distributing free space within the first and second sets of rows of the file object by distributing free space differently for the first range of key values than for the second range of key values,” which is referred to in the specification at pg. 9 (*l.* 9) to pg. 10 (*l.* 14) to pg. 11 (*l.* 8); pg. 12 (*ll.* 6-19); and pg. 13 (*ll.* 8-9 and 26-27) and in the drawings by reference character (350) of FIG. 3b.

D. Concise Explanation of Independent Claim 39

Independent claim 39 is directed to a program storage device, readable by a programmable control device, comprising instructions stored on the program storage device.

The programmable control device is caused to:

(1) “designate a first set of rows of a file object with a first range of key values,” which is referred to in the specification at pg. 8 (*ll.* 26-31); pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); pg. 16 (*ll.* 10-19); and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES, KEYRANGESETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4 and by reference character (604) of FIG. 6.

(2) “designate a second set of rows of the same file object with a second range of key values,” which is referred to in the specification at pg. 8 (*ll.* 26-31); pg. 13 (*ll.* 8-9 and 26-27); pg. 14 (*ll.* 21-30); pg. 15 (*ll.* 6-12 and 19-29); pg. 16 (*ll.* 10-19); and pg. 18 (*ll.* 17-23) and in the drawings by reference to KEYRANGES, KEYRANGESETS, KEYRANGESTATS, and KEYCOLUMNS of FIG. 4 and by reference character (604) of FIG. 6.

(3) “distribute free space differently for the first range of key values than for the second range of key values to non-uniformly distribute free space within the first and second sets of rows of the same file object,” which is referred to in the specification at pg. 9 (*l.* 9) to pg. 10 (*l.* 14) to pg. 11 (*l.* 8); pg. 12 (*ll.* 6-19); and pg. 13 (*ll.* 8-9 and 26-27) and in the drawings by reference character (350) of FIG. 3b.

GROUND OF REJECTIONS TO BE REVIEWED ON APPEAL

- A. Whether Claims 18-34 are Unpatentable over Iyer in view of Pereira under 35 U.S.C. § 103(a).

- B. Whether Claims 35-42 are Unpatentable over Iyer in view of Eberhard under 35 U.S.C. § 103(a).

ARGUMENT

A. Whether Claims 18-34 are Unpatentable over Iyer in view of Pereira under 35 U.S.C. § 103(a)

Claims 18-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,411,964 to Iyer et al. (“Iyer”) in view of U.S. Patent No. 6,584,474 to Pereira (“Pereira”). Appellant traverses the contention that claims 18-34 are rendered obvious over Iyer in view of Pereira insofar as (1) the combination of Iyer and Pereira does not disclose each claimed element of Appellant’s independent claims 18 and 28 and dependent claims 25-27 and (2) there is no motivation to combine Iyer and Pereira.

1. Legal Principles

To establish a *prima facie* case of obviousness, three criteria must be met: (1) there must be some suggestion or motivation to make the combination; (2) there must be a reasonable expectation of success; and (3) the cited prior art references must teach or suggest all of the claimed limitations. *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d (BNA) 1438, 1442 (Fed. Cir. 1991); *see also* M.P.E.P. 2143. “The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” M.P.E.P. 2143.01 *quoting In re Mills*, 916 F.2d 680, 682, 16 U.S.P.Q.2d (BNA) 1430, 1432 (Fed. Cir. 1990); *see also In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d (BNA) 1453, 1458 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obviousness was held improper.). The Court of Appeals for the Federal Circuit has held time and again that “[o]bviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive

supporting the combination.” *In re Bond*, 910 F.2d 831, 834, 15 U.S.P.Q.2d (BNA) 1566, 1568 (Fed. Cir. 1990), *quoting Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140, 231 U.S.P.Q. (BNA) 644, 647 (Fed. Cir. 1986); *see also, e.g., In re Stencel*, 828 F.2d 751, 755, 4 U.S.P.Q.2d (BNA) 1071, 1073 (Fed. Cir. 1987) (reversing Board holding of obviousness); *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. (BNA) 929, 933 (Fed. Cir. 1987) (reversing district court holding of obviousness).

2. Disclosure of Iyer

Iyer is directed to providing in-place reorganization of a database, which Iyer discloses as a partitioned tablespace and a non-partitioned tablespace. Iyer states that “[p]artitions reside in different files; a non-partitioned table 108 space can reside in one file.” Iyer at col. 6 (*ll.* 51-52). Thus, one partition resides in one file. Similarly, a non-partitioned tablespace resides in one file.

Iyer’s disclosure is directed to distributing free space evenly in the same file (*e.g.*, a file for a partition of a partitioned tablespace or a file for a non-partitioned tablespace). *See e.g., Id.* at col. 3 (*ll.* 47-50) and col. 7 (*ll.* 25-27). In particular, Iyer discloses using “desired frequency of free pages” and “desired percent of free space per page” during online reorganization of a tablespace. *See e.g., Id.* at col. 17 (*ll.* 51-52). Distributing free pages in one file for a partition of a tablespace or in one file for a non-partitioned tablespace according to a “desired frequency of free pages” or a “desired percent of free space per page” results in the free space in that one file being evenly distributed, which is what Iyer is expressly directed to.

In contrast to the claimed invention, Iyer describes uneven distribution of free space as a type of “degradation” that can cause poor performance. *See Id.* at col. 7 (*ll.* 11-26). Reorganization in accordance with Iyer is purposefully designed to remove such structural degradation such that free space is evenly distributed throughout a tablespace. *Id.* at col. 7 (*ll.*

24-27). Thus, Iyer teaches the use of “desired frequency of free pages” and “desired percent of free space per page” to uniformly manage the free space in one file (*e.g.*, in one partition of a partitioned tablespace or in an entire non-partitioned tablespace). *Id.* at col. 17 (*ll.* 49-60) and FIG. 11, element 1126. Accordingly, Iyer explicitly teaches away from the claimed invention.

3. Disclosure of Pereira

Pereira is directed to analysis of a database table that has allocated blocks and to determine an information set relating to the health of the table. Pereira at col. 2 (*ll.* 18-21). The analysis is performed by a “Fast Analysis” primarily disclosed from col. 4, line 58 to col. 14, line 3. Use of this Fast Analysis is described as being useful because “[i]f a lot of row migration has occurred, the database administrator may likely decide to rebuild the tables to more efficiently allocate row space.” As an example provided in Pereira, a Database Administrator makes a decision regarding how row allocation will be managed within the blocks of the database table. To manage row allocation, the Database Administrator sets a percentage of blocks free (PCTFREE) or percentage of blocks used (PCTUSED) for the database table. PCTFREE can be set when the database table is created so that Database Management System (DBMS) can keep a percentage of the blocks free at least equal to the percentage PCTFREE as the DBMS fills up each block with table information. *Id.* at col. 3 (*l.* 66) to col. 4 (*l.* 6).

The PCTFREE percentage is set according to how the database table is to be used. If a table is to have frequent updates, additional PCTFREE is established so that row migration for the database table does not occur across multiple blocks of the table. *Id.* at col. 4 (*ll.* 7-22). Instead, the PCTFREE value is set for the database table so that row migration occurs within the same blocks of the database table. By keeping row migration to the same blocks of the table,

migrated rows of the database table can be retrieved by reading a single block rather than reading multiple blocks of the table. *Id.* at col. 4 (*ll.* 13-26).

By setting a PCTFREE value for the database table, Pereira discloses distributing free space uniformly across the database table because Pereira discloses setting the entire database table with one PCTFREE value for all the blocks of the table. The Database Administrator merely sets the value for PCTFREE for the entire database table based on how often the database table is to be updated so that row migration occurs within the same blocks of the database table.

Analysis of the database table is performed by reading a header block describing the location of blocks storing data information of the database table. The health or condition of the database table is then determined from data read from the data blocks. *Id.* at Abstract and col. 2 (*ll.* 18-21). The information analyzed includes the average free space in a block unused, the average free released free space, and the number of blocks less a percentage free threshold. *Id.* at col. 2 (*ll.* 27-39).

In the analysis of the health and condition of the database table, the Database Administrator looks to see how closely the use of blocks of the database table correspond to the values of PCTUSED and PCTFREE set for that table. If there is a discrepancy, the Database Administrator may determine “that too much row migration is taking place and that it may be preferable to rebuild the tables with optimal values of PCTFREE and/or PCTUSED.” *Id.* at col. 4 (*ll.* 38-47). Thus, Pereira does not state that different PCTFREE values can be used to manage free-space non-uniformly within the same database file, between two tables, nor within a single table. Pereira apparently contemplates rebuilding tables with a new PCTFREE value in a reorganization if analysis shows a discrepancy between the health determined and the values of PCTUSED and PCTFREE. *See Id.*

4. Iyer in view of Pereira Fails to Disclose Each Claimed Element of Independent Claims 18 and 28

Appellant's independent claims 18 and 28 are directed to free space management of a database file where free space values associated with the first and second set of rows identified by first and second ranges of key values are managed differently to produce non-uniform distribution of free space in the database file. *See* claims 18 and 28 in the Summary of Claimed Subject Matter above.

At no time does Iyer teach that a database file's free space may be managed non-uniformly. At no time does Iyer even suggest that such an operation may be beneficial. Rather, Iyer discloses distributing free pages in one file for a partition of a tablespace or in one file for a non-partitioned tablespace according to a "desired frequency of free pages" or a "desired percent of free space per page" during a reorganization. *See e.g.*, Iyer at col. 17 (*ll.* 51-52). Thus, Iyer expressly teaches the uniform management of free space in contrast to the claimed invention. Further in contrast to the claimed invention, Iyer *expressly* teaches that the non-uniform distribution of free space is a type of "degradation" that can lead to poor performance. *See Id.* at col. 7 (*ll.* 11-26). Hence, Iyer explicitly discloses reorganization to distribute free space uniformly using a "desired frequency of free pages" or a "desired percent of free space per page." Accordingly, not only does Iyer not teach the claimed elements of independent claims 18 and 28, Iyer actually teaches away from the claimed elements of these independent claims.

In addition, Iyer makes no mention of assigning different free space parameters to different ranges of key values, as required by Appellant's independent claims 18 and 28. Instead, Iyer references "key values" when discussing the storage structure for indices. *See e.g.*, *Id.* at col. 6 (*ll.* 6-62). In addition, Iyer makes no mention of managing different key range

values with different free space parameters to produce non-uniform distribution of free space in a database file. Instead, Iyer applies the same values of “desired frequency of free pages” and “desired percent of free space per page” to the entire database file during online reorganization so that free space can be evenly distributed. *See e.g., Id.* at col. 7 (*ll.* 10-35) and col. 17 (*ll.* 49-55).

The Examiner concedes that Iyer “do[es] not explicitly disclose wherein the second values differ from the first values by at least one free space management parameter value, thereby producing non-uniform distribution of free space in the database file.” *Final Office Action* at page 4. Despite the fact that Iyer concededly does not meet the claimed elements of independent claims 18 and 28 and that Iyer actually teaches away from the claimed elements of these independent claims, Pereira is cited as providing the missing elements from Iyer in an attempt to render independent claims 18 and 28 obvious. However, Pereira fails to provide the claimed elements missing from Iyer.

As noted above, Pereira is directed to analysis of a database table that has allocated blocks. *See Pereira* at Abstract and col. 3 (*ll.* 9-13). At no time does Pereira teach that the database table’s free space may be managed non-uniformly. In addition, Pereira makes no mention of ranges of key values of the database table, and Pereira makes no mention of assigning different free space parameters to different key range values of the database table. Instead, Pereira discloses setting a PCTFREE value so that a percentage of the blocks of the database table can be kept free at least equal to the percentage of PCTFREE as the table is filled with information. *See Id.* at col. 3 (*l.* 66) to col. 4 (*l.* 6). The value chosen for PCTFREE is applied to the entire database table and is set so that row migration occurs within the same block of the database table. *See Id.* at col. 4 (*ll.* 7-26). However, Pereira does not teach or suggest that

different PCTFREE values can be set within the same database file to manage free-space non-uniformly in the database file. Rather, Pereira discloses that a PCTFREE value can be set when a table is built and that the table can be reorganized with a new PCTFREE value if analysis shows a discrepancy in how free-space is used. Consequently, Pereira fails to provide the claimed elements missing from Iyer.

For at least these reasons, Iyer and Pereira (alone or in combination) fail to disclose all claimed elements recited in independent claims 18 and 28 because Iyer and Pereira both fail to disclose managing different key ranges of a database file with different values of free space management parameters so that non-uniform distribution of free space is produced in the database file.

**5. Iyer in view of Pereira Fails to Disclose Each Claimed Element of
Dependent Claims 25-27**

In addition to the reasons above, the combination of Iyer in view of Pereira fails to disclose each claimed element in dependent claims 25-27. Claims 25 and 26, respectively, call for identifying first rows in a data table or index table and identifying second rows in a data table or index table to manage free space non-uniformly between the first and second rows. Claim 27 calls for a single table having first and second sets of rows with free-space managed non-uniformly between them. The combination of Iyer and Pereira does not teach or suggest managing free space non-uniformly in different sets of rows in a single table or in two different tables because Iyer discloses reorganizing an entire database file with uniform free space and Pereira discloses analyzing a table to see if there is a discrepancy between a PCTFREE value and a PCTUSED value.

6. There is No Motivation To Combine Iyer and Pereira

Even if one were to accept the Examiner's interpretation of Iyer and Pereira (which Appellant explicitly refutes above), the Examiner has failed to establish how either Iyer or Pereira provides the motivation to be combined. Instead, the Examiner only states that the motivation to combine comes from wanting "to better allow the free space be distributed to tables/segments/partitions of data based on their usage, thereby, increasing database system's performance." *Final Office Action* at page 4.

First, the motivation of wanting "to allow more flexible utilization of free spaces" is a "goal." Merely stating a goal is not the same as providing a motivation to combine. Rather, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." MPEP 2143.01 (I) citing to *In re Kotzab*, 217 F.3d 1365, 1370, 55 U.S.P.Q.2d (BNA) 1313, 1317 (Fed. Cir. 2000). Furthermore, merely stating a "goal" fails to meet the importance of relying on objective evidence and making specific factual findings to establish a motivation to combine references. See *In re Lee*, 277 F.3d 1338, 1342-44, 61 U.S.P.Q.2d (BNA) 1430, 1433-34 (Fed. Cir. 2002). Thus, the Examiner has failed to establish a teaching, suggestion, or motivation to combine Iyer and Pereira.

Further with respect to motivation, the Examiner contends in the Examiner's Answer that the motivation to combine Iyer with Pereira can be found on page 4 of the Final Office Action. Again, Appellant points out that page 4 of the Final Office Action merely states a goal, and the Examiner has not establish where in either Iyer or Pereira the motivation to be combined can be found. In addition, the Examiner states in the Examiner's Answer that "[i]t is simple to

understand the benefit of allowing the reorganization of data within a particular partition/set of rows among partitions/sets of rows appropriately based on its usage, that not only increase[s] that database system's performance (*e.g.*, processes data faster), but can also reduce related costs."

Appellant contends that this also fails to provide a motivation to combine Iyer with Pereira, because the statement that it is simple to understand a certain benefit fails to establish where either Iyer or Pereira provide the motivation to be combined.

Second, Iyer expressly teaches away from uneven distribution of free space. *See* Iyer at col. 7 (*ll.* 12-15). As discussed previously, Iyer teaches away from non-uniform management of free space, because Iyer teaches that non-uniform distribution of free space is a type of "degradation" that can lead to poor performance. To solve this problem, Iyer explicitly discloses reorganization to distribute free space uniformly using a "desired frequency of free pages" or a "desired percent of free space per page." It is recognized that "[i]t is improper to combine references where the references teach away from their combination." MPEP 2145(X)((D)(2) citing *In re Grasselli*, 713 F.2d 731, 743, 218 U.S.P.Q. (BNA) 769, 779 (Fed. Cir. 1983). Accordingly, it would be improper to combine Iyer with another reference such as Pereira to justify uneven distribution of free space because Iyer teaches away from such a combination.

Even in face of the clear teaching of Iyer and established case law, however, the Examiner contends in the Examiner's Answer that Iyer does not teach away from Appellant's claimed invention. In particular, the Examiner states that "[s]ince Iyer et al. allow the reorganize[d] data in a partition, and also Iyer et al. do not specify that a different free space parameter cannot be assigned to that partition during the reorganization process, Iyer et al. do not teach away from Appellant's independent claims." Examiner's Answer at page 18-19. From this, Appellant understands that the Examiner contends that Iyer does not teach away from

Appellant's claims based on what Iyer does not specify in its disclosure. Namely, the Examiner seems to say that Iyer does not specifically state that different free space parameters cannot be assigned to a partition file during the reorganization process, and for this reason, Iyer does not teach away from Appellant's claimed invention. If this is the case, Appellant points out that Appellant's argument is based on what Iyer actually states not on what Iyer fails to state. Namely, Iyer states that the non-uniform distribution of free space is a type of degradation and that reorganization of a partitioned file to distribute free space uniformly using a "desired frequency of free pages" or a "desired percent of free space per page" solves this degradation. These are the express teachings of Iyer, and these teachings are divergent from Appellant's claimed invention of purposefully managing free space non-uniformly in a single database file.

For at least these reasons, there is no motivation to combine Iyer in view of Pereira, and lacking a motivation to combine, Iyer in view of Pereira cannot render claims 18-34 as obvious.

7. Conclusion Regarding Section 103 Rejection of Claims 18-34

Because Iyer and Pereira fail to teach or describe (alone or in combination) *all* the claimed elements of Appellant's independent claims 18 and 28, Iyer and Pereira fail to support a *prima facie* case of obviousness under section 103. Furthermore, even if Iyer and Pereira are (wrongly) interpreted to teach each claimed element, the rejection is improper because there is no evidence that the references themselves include a motivation to be combined. For at least these reasons, independent claims 18 and 28 are not rendered obvious by the combination of Iyer and Pereira. For at least the same reasons, claims 19-27 and 29-34 (each of which depend from one of the independent claims 18 and 28) are not rendered obvious by the combination of Iyer and Pereira. Accordingly, Appellant respectfully requests that the Board withdraw the section 103 rejection of claims 18-34.

B. Whether Claims 35-42 are Unpatentable over Iyer in view of Eberhard under 35 U.S.C. § 103(a).

Claims 35-42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,411,964 (“Iyer”) in view of U.S. Patent No. 6,003,022 (“Eberhard”). Appellant traverses the contention that claims 35-42 are rendered obvious over Iyer in view of Eberhard insofar as (1) the combination of Iyer and Eberhard does not disclose all claimed elements of Appellant’s independent claims 35 and 39 and dependent claims 36 and 40 and (2) there is no motivation to combine Iyer and Eberhard.

1. Disclosures of Iyer and Eberhard

As discussed previously, Iyer is directed to providing in-place reorganization of a database by redistributing free space using “desired frequency of free pages” and “desired percent of free space per page” to overcome the “degradation” caused by uneven distribution of free space. *See* Section A(2) above. On the other hand, Eberhard is directed to a software tool that estimates the costs of an application program accessing a database. The costs may be execution costs of the application or of a transaction, SQL statement, and/or a utility. Execution costs include CPU time, I/O time and minimum elapsed time. *See* Eberhard at Abstract. A graphical user interface allows a user to input values for free page (212) and percent free (211) for a table (*e.g.*, STOCK table in FIG. 2B). *Id.* at col. 7 (*l.* 35) to col. 8 (*l.* 5), and Figs. 2A-2C. Thus, Eberhard allows a user to set the number of pages before a completely empty page is left (212) and the percent free space (211) for a table when creating a definition of a table or when downloading a definition of a table for use in conjunction with the estimator tool. *Id.* at col. 8 (*ll.* 33-45). The graphical interfaces in Figs. 2A-2C define a table for the estimator tool and are not disclosed as managing the table or managing different key values with different free space values.

2. Iyer in view of Eberhard Fails to Disclose Each Claimed Element of Independent Claims 35 and 39

Appellant's independent claims 35 and 39 are directed to free space management of a file object of a database where free space is non-uniformly distributed within the first and second sets of rows of the file object designated by first and second ranges of key values by distributing free space differently for the first range of key values than for the second range of key values. *See* claims 35 and 39 in the Summary of Claimed Subject Matter above.

As discussed previously, at no time does Iyer teach that a database file's free space may be distributed non-uniformly by distributing free space differently for ranges of key values. At no time does Iyer even suggest that such an operation may be beneficial. Rather, Iyer discloses distributing free pages in one file for a partition of a tablespace or in one file for a non-partitioned tablespace according to a "desired frequency of free pages" or a "desired percent of free space per page," which results in even distribution of free space in the file. *See e.g.*, Iyer at col. 17 (*ll.* 51-52). In fact, Iyer *expressly* teaches that the non-uniform distribution of free space is a type of "degradation" that can lead to poor performance. *See Id.* at col. 7 (*ll.* 11-26). Accordingly, not only does Iyer not teach the claimed elements of independent claims 18 and 28, Iyer actually teaches away from the claimed elements of these independent claims.

The Examiner concedes that Iyer "does not explicitly disclose non-uniformly distributing free space within the first and second sets of rows of the file object by distributing free space differently for the first range of key values than for the second range of key values." *Final Office Action* at page 8. Despite the fact that Iyer concededly does not meet the claimed elements of independent claims 35 and 39 and that Iyer actually teaches away from the claimed elements of these independent claims, Eberhard is cited as providing the missing elements from

Iyer in an attempt to render independent claims 35 and 39 obvious. However, Eberhard fails to provide the claimed elements missing from Iyer.

As noted above, Eberhard is directed to a software tool that estimates the execution costs of an application program accessing a database. A graphical user interface of the tool allows the user to set the number of pages before a completely empty page is left (212) and the percent free space (211) for a table. *See* Eberhard at col. 7 (*l.* 35) to col. 8 (*l.* 5). However, at no time does Eberhard teach or fairly suggest that a user can set different percent free space values for different key values of the same object file. At most, Eberhard discloses allowing a user to set a single percent free space value when defining a table for the estimator tool. Setting of the percent free space in the graphical interfaces of Figs. 2A-2C is disclosed as being used to define a table for the estimator tool and is not disclosed as being used to non-uniformly manage free space in an object file. Consequently, Eberhard fails to provide the limitations missing from Iyer.

For at least these reasons, Iyer and Eberhard (alone or in combination) fail to disclose all claimed elements recited in independent claims 35 and 39 because Iyer and Eberhard both fail to disclose non-uniformly distributing free space within the first and second sets of rows of the file object by distributing free space differently for the first range of key values than for the second range of key values.

3. Iyer in view of Pereira Fails to Disclose Each Claimed Element of Dependent Claims 36 and 40

In addition to the reasons above, the combination of Iyer in view of Eberhard fails to disclose the claimed elements of dependent claims 36 and 40. Claims 36 and 40 call for the file object to be selected from the group consisting of a page set, a table within a database file, and a

plurality of tables in a database file. The combination of Iyer and Eberhard does not teach or suggest managing free space non-uniformly in different sets of rows in a page set, in a table, nor in different tables because Iyer discloses reorganizing an entire database file with uniform free space and Eberhard discloses defining values associated with a table for an estimation tool.

4. There is No Motivation To Combine Iyer and Eberhard

Even if one were to accept the Examiner's interpretation of Iyer and Eberhard (which Appellant explicitly refutes above), the Examiner has failed to establish how either Iyer or Eberhard provides the motivation to be combined. Instead, the Examiner only states that the motivation to combine comes from wanting "to allow more flexible utilization of free spaces, which is more appropriately changed to different usage environments." *Final Office Action* at page 9.

The motivation of wanting "to allow more flexible utilization of free spaces" is a "goal." As noted previously, merely stating a "goal" is not the same as providing a motivation to combine because the "goal" fails to show where the teaching, suggestion, or motivation can be found explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art and fails to meet the importance of relying on objective evidence and making specific factual findings to establish a motivation to combine references. *See* M.P.E.P. 2143.01 (I); *See also In re Lee*, 61 U.S.P.Q.2d 1430, 1433-34.

Further with respect to motivation, the Examiner contends in the Examiner's Answer that the motivation to combine Iyer with Eberhard can be found on page 9 of the Final Office Action. Again, Appellant points out that page 9 of the Final Office Action merely states a goal, and the Examiner has not established where in either Iyer or Pereira the motivation to be combined can be found. In addition, the Examiner states in the Examiner's Answer that "[i]t is simple to

understand the benefit of allowing the reorganization of data within a particular partition/set of rows among partitions/sets of rows appropriately based on its usage, that not only increase[s] that database system's performance (*e.g.*, processes data faster), but can also reduce related costs."

Appellant contends that the statement that it is simple to understand a certain benefit also fails to provide motivation to combine Iyer with Eberhard, because this statement again fails to establish where either Iyer or Eberhard provide the motivation to be combined.

Second, Iyer expressly teaches away from the uneven distribution of free space. *See* Iyer at col. 7 (*ll.* 12-15). As discussed previously, Iyer teaches away from non-uniform management of free space, because Iyer teaches that non-uniform distribution of free space is a type of "degradation" that can lead to poor performance. To solve this problem, Iyer explicitly discloses reorganization to distribute free space uniformly using a "desired frequency of free pages" or a "desired percent of free space per page." It is recognized that "[i]t is improper to combine references where the references teach away from their combination." MPEP 2145(X)((D)(2) *citing In re Grasselli*, 713 F.2d 731, 743, 218 USPQ (BNA) 769, 779 (Fed. Cir. 1983).

Accordingly, it would be improper to combine Iyer with another reference such as Eberhard to justify uneven distribution of free space because Iyer teaches away from such a combination.

Even in face of the clear teaching of Iyer and established case law, however, the Examiner contends in the Examiner's Answer that Iyer does not teach away from Appellant's claimed invention. In particular, the Examiner states that "[s]ince Iyer et al. allow the reorganize[d] data in a partition, and also Iyer et al. do not specify that a different free space parameter cannot be assigned to that partition during the reorganization process, Iyer et al. do not teach away from Appellant's independent claims." Examiner's Answer at page 18-19. From this, Appellant understands that the Examiner contends that Iyer does not teach away from

Appellant's claims based on what Iyer does not specify in its disclosure. Namely, the Examiner seems to say that Iyer does not specifically state that different free space parameters cannot be assigned to a partition file during the reorganization process, and for this reason, Iyer does not teach away from Appellant's claimed invention. If this is the case, Appellant points out that Appellant's argument is based on what Iyer actually states. Namely, Iyer state that non-uniform distribution of free space is a type of degradation and that reorganization of a partition file with a reorganization to distribute free space uniformly using a "desired frequency of free pages" or a "desired percent of free space per page" solves this degradation. These are the teachings of Iyer, and these teachings teach away from Appellant's claimed invention of purposefully managing free space non-uniformly in a single database file.

For at least these reasons, there is no motivation to combine Iyer in view of Eberhard, and lacking a motivation to combine, Iyer in view of Eberhard cannot render claims 35-42 as obvious.

5. Conclusion Regarding Section 103 Rejection of Claims 35-42

Because Iyer and Eberhard fail to teach or suggest (alone or in combination) *all* the claimed elements of Appellant's independent claims 35 and 39, Iyer and Eberhard fail to support a *prima facie* case of obviousness under section 103. Furthermore, even if Iyer and Eberhard are (wrongly) interpreted to teach each claimed element, the Examiner has failed to show any evidence that the references themselves include a motivation to be combined. For at least these reasons, independent claims 35 and 39 are not rendered obvious by the combination of Iyer and Eberhard. For at least the same reasons, dependent claims 36-38 and 40-42 are not rendered obvious by the combination of Iyer and Eberhard. Accordingly, Appellant respectfully requests that the Board withdraw the section 103 rejection of claims 35-42.

C. Conclusion

In conclusion, the combination of Iyer and Pereira does not render Appellant's claims 18-34 obvious because (1) the combination does not teach or suggest each claimed element and (2) there is no motivation to combine Iyer and Pereira. In addition, the combination of Iyer and Eberhard does not render Appellant's claims 35-42 obvious because (1) the combination does not teach or suggest each claimed element and (2) there is no motivation to combine Iyer and Eberhard. Consequently, Appellant respectfully requests that the Board grant Appellant's appeal and withdraw the rejections of claims 18-42 under 35 U.S.C. § 103.

Respectfully submitted,

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CLAIMS APPENDIX

1-17. (Cancelled)

18. (Previously Presented) A database free space management method, comprising:

identifying a first range of key values associated with a first set of rows in a database file;
assigning first values to each of a plurality of free space management parameters
associated with the first range of key values;
identifying a second range of key values associated with a second set of rows in the
database file;
assigning second values to each of a plurality of free space management parameters
associated with the second range of key values;
managing free space associated with the first set of rows in accordance with the first
values; and
managing free space associated with the second set of rows in accordance with the
second values,
wherein the second values differ from the first values by at least one free space
management parameter value, thereby producing non-uniform distribution of free
space in the database file.

19. (Previously Presented) The method of claim 18, wherein the first set of rows are
associated with a first table in the database file and the second set of rows are associated with a
second table in the database file.

20. (Previously Presented) The method of claim 18, wherein the act of identifying a first range of key values comprises identifying a first key value and a second key value, wherein the first range of key values defines a contiguous range of rows as indicated by the first key value and the second key value.

21. (Previously Presented) The method of claim 20, wherein the act of identifying a second range of key values comprises identifying a third key value and a fourth key value, wherein the second range of key values defines a contiguous range of rows as indicated by the third key value and the fourth key value.

22. (Previously Presented) The method of claim 18, wherein one or more of the free-space management parameters are selected from the group consisting of “free page value,” “free pages value,” “percent free value,” “end of key range number of free pages” and “maximum number of rows.”

23. (Previously Presented) The method of claim 18, wherein the act of assigning first values to each of a plurality of free space management parameters comprises accepting user input for at least one of the first values.

24. (Previously Presented) The method of claim 23, wherein the act of assigning second values to each of the plurality of free space management parameters comprises accepting user input for at least one of the second values.

25. (Previously Presented) The method of claim 18, wherein the first set of rows in the database file comprise rows in a data table or an index.

26. (Previously Presented) The method of claim 18, wherein the second set of rows in the database file comprise rows in a data table or an index.

27. (Previously Presented) The method of claim 18, wherein the first sets of rows and the second set of rows comprise rows from a single table.

28. (Previously Presented) A program storage device, readable by a programmable control device, comprising instructions stored thereon for causing the programmable control device to:

identify a first range of key values associated with a first set of rows in a database file;

assign first values to each of a plurality of free space management parameters associated with the first range of key values;

identify a second range of key values associated with a second set of rows in the database file;

assign second values to each of a plurality of free space management parameters associated with the second range of key values;

manage free space associated with the first set of rows in accordance with the first values; and

manage free space associated with the second set of rows in accordance with the second values,

wherein the second values differ from the first values by at least one free space management parameter value, thereby producing non-uniform distribution of free space in the database file.

29. (Previously Presented) The program storage device of claim 28, wherein the instructions to identify a first range of key values comprise instructions to identify a first key value and a second key value, wherein the first range of key values defines a contiguous range of rows as indicated by the first key value and the second key value.

30. (Previously Presented) The program storage device of claim 29, wherein the instructions to identify a second range of key values comprise instructions to identify a third key value and a fourth key value, wherein the second range of key values defines a contiguous range of rows as indicated by the third key value and the fourth key value.

31. (Previously Presented) The program storage device of claim 18, wherein the instructions to:

identify the first range of key values associated with the first set of rows in the database file, comprise instructions to identify rows from a first table; and

identify the second range of key values associated with the second set of rows in the database file, comprise instructions to identify rows from a second table.

32. (Previously Presented) The program storage device of claim 31, wherein the first table comprises a data table or an index and the second table comprises a data table or an index.

33. (Previously Presented) The method of claim 18, wherein the database file is a page set.

34. (Previously Presented) The program storage device of claim 28, wherein the database file is a page set.

35. (Previously Presented) A database free space management method, comprising:
- designating a first set of rows of a file object with a first range of key values;
 - designating a second set of rows of the file object with a second range of key values; and
 - non-uniformly distributing free space within the first and second sets of rows of the file object by distributing free space differently for the first range of key values than for the second range of key values.
36. (Previously Presented) The method of claim 35, wherein the file object is selected from the group consisting of a page set, a table within a database file, and a plurality of tables in a database file.
37. (Previously Presented) The method of claim 35, wherein the act of non-uniformly distributing free space within the first and second sets of rows of the same file object by distributing free space differently for the first range of key values than for the second range of key values comprises:
- assigning first values to each of a plurality of free space management parameters associated with the first range of key values for the first set of rows; and
 - managing free space associated with the first set of rows in accordance with the first values.

38. (Previously Presented) The method of claim 37, wherein the act of non-uniformly distributing free space within the first and second sets of rows of the same file object by distributing free space differently for the first range of key values than for the second range of key values comprises:

assigning second values to each of a plurality of free space management parameters associated with the second range of key values for the second set of rows, wherein the second values differ from the first values by at least one free space management parameter value; and
managing free space associated with the second set of rows in accordance with the second values.

39. (Previously Presented) A program storage device, readable by a programmable control device, comprising instructions stored thereon for causing the programmable control device to:

designate a first set of rows of a file object with a first range of key values;
designate a second set of rows of the same file object with a second range of key values;
and
distribute free space differently for the first range of key values than for the second range of key values to non-uniformly distribute free space within the first and second sets of rows of the same file object.

40. (Previously Presented) The program storage device of claim 39, wherein the file object is selected from the group consisting of a page set, a table within a database file, and a plurality of tables in a database file.

41. (Previously Presented) The program storage device of claim 39, wherein to distribute free space differently for the first range of key values than for the second range of key values to non-uniformly distribute free space within the first and second sets of rows of the same file object, the instructions cause the programmable control device to:

assign first values to each of a plurality of free space management parameters associated with the first range of key values for the first set of rows; and
manage free space associated with the first set of rows in accordance with the first values.

42. (Previously Presented) The program storage device of claim 41, wherein to distribute free space differently for the first range of key values than for the second range of key values to non-uniformly distribute free space within the first and second sets of rows of the same file object, the instructions cause the programmable control device to:

assign second values to each of a plurality of free space management parameters associated with the second range of key values for the second set of rows, wherein the second values differ from the first values by at least one free space management parameter value; and
manage free space associated with the second set of rows in accordance with the second values.

EVIDENCE APPENDIX

<< NONE >>

RELATED PROCEEDINGS APPENDIX

<< NONE >>